The following text contains the review of the May 10th, 1999 version of "ECOFRAM Terrestrial *Draft* Report." The recommendations forwarded by the panel incorporate many sound principles that will improve the overall ecological risk assessment process. Many of the concepts proposed for use are essential. However, some points should be addressed to strengthen the approach. These additions are listed in the itemized review below followed by more minor editorial comments.

Reviewer Comments
for ECOFRAM Terrestrial *Draft* Report

MAJOR COMMENTS

Page	Line	Comment
1-9	15	Note: Reviewers will understand the basis of quotient, but there should at least be a reference for quotient calculations here.
1-11	8-9	Note: At what point does the math become tedious or complex?
1-17	5-7	Note: Organism contact with toxicant should also be considered in this portion of the process..
	14-16	Note: This process is further complicated by different uptake rates by different species and from different food types.
	22-25	Note: This may be required on a case by case basis.
1-31	24-25	Note: This approach assumes a threshold and produces a step function which may be quite unrealistic.
2-9	Figure 2.5-1	There are several items that should be addressed in this critical table. Throughout table, change “insects” to “invertebrates.” This is a significant omission.
	“	Arrow is missing on lower left of table.
	“	On 7th line of table, change “secondary toxicity to predators” to “Ingestion of granules has been shown to cause direct unacceptable mortality; that toxicity is not limited to predators of exposed vertebrates.”
	“	Change “drinking water” to “surface water” as drinking water has specific connotations with those in EPA who regulate water supplies for humanconsumption.
	“	On 11th line of table, note that there is exceedingly low exposure potential for aquatic organisms through groundwater.
2-13	22	Note: States are severely artificial in this approach. These are ecological risks; wildlife do not recognize these boundaries.
3-2	2-4	Note: This view of pesticide uptake considers only oral exposure and needs to be expanded.
3-4	5	Note: It is important to allow or consider other bronchial exposures or to classify them as ingestion. This is not a bad classification since most upper respiratory clearances involve toxicant transport into the esophagus in mucous secretions.
3-6	2	Note: Does “field capacity” refer to water capacity?
	3	Insert “cation exchange capacity” after “conductivity”
3-12	8	Note: If you are modeling, estimates of each time unit (daily or even hourly) can be easily done.
3-18	8-9	Note: Why? The argument against activity/ time-on-field estimates is

		unconvincing. Nest activity monitors, radiotelemetry and digital photography of returning adults facilitates these estimates.
	25-26	Note: This distinction of treated and drift zones is important measurement if final tier evaluations are needed.
3-19	1-3	Note: **Not considering real-life pesticide interactions is a severe shortcoming and must be addressed in refinements of this process.** Example ***phen-fen***.
3-20	Graph	Enlarge figure and text within figure. Current presentation is NOT useful.
3-27	19	Note: Why would radiotelemetry and video recording be very difficult to establish these essential parameters?
	27	Note: Why are mammals now reintroduced? Earlier discussion omitted all non-avian species.
3-37	15	Note: Using average values would severely underestimate problems, as noted in Cobb, et.al., in press. Exposures associated with mortality occur soon after applications when pesticide concentration is still significantly above the average concentration. It would be best to use estimates of average pesticide concentrations during the first 3-5 days (0-3 or 0-5) after application for normal use pesticides in the US.
3-43	5-6	(Item (2)) Note: I question the importance of this route for granulars, and generally agree with ingestion predominance.
	24	Note: What about granules lodged into shoots of developing plants in banded treatments? I have personally observed these granules in plant crevasses.
3-46	Figure	Note: Also consider application depth in upper right corner box. In general, some data indicate that high risk granule exposure occurs during soil probing for food, not during grit acquisition.
3-47	1	Note: What evidence exists for grit “selection” by birds?
	18-19	Note: This misses an entire class of soil probing birds. This shortcoming must be addressed.
3-53	3-19	Note: This approach needs to assume bird density and flocking, since to a first approximation all wildlife densities will be greater where food is abundant..
3-54	10	Note: Failing to consider exposures via soil ingestion does not justify omitting it. This is a major shortcoming of the approach.
3-56	2-12	Note: Rainfall is very important, especially if you are trying to perform a probabilistic assessment. Mentions this briefly and refer readers to the appropriate appendix where this information is presented.
5-61	14	Note: Consider drift in this estimate.
3-66	17	Note: Computer models only work when field-validated kinetic data are available. Otherwise the best probabilistic efforts and all the precision in the world will still produce THE WRONG ANSWER.

3-74	1-2	Note: If estimating pesticide degradation, is plant uptake large enough to be larger than error in the degradation estimate? This should be considered seriously. I believe that plant uptake is a minor route of pesticide exposure to wildlife. Good review of the literature is needed here to document the known information and to justify the chosen approach.
	25	All environmental rate constants should be termed PSEUDO FIRST ORDER unless a) all but one component contribution to the overall process have been shown to be insignificant or b) the rates have been shown to be first order with respect to the combination of oxygen, water and other important reactants.
3-78	21-22	Note: First derivative will provide breakpoint in such a set of coordinates. If this regression is suggested, a method better than eyeballing must be presented. First derivatives can be estimated as simple slope determinations between existing points on the curve and need not be rigorously modeled/fit functions. If there is no distinct break in the slope with a derivative plot, then there is no evidence to support eye-balling the data to an arbitrary break point. If the slope data are fuzzy around the "break-point" then a second derivative estimate calculated from the existing first derivative data would clarify this since inflection points produce a discontinuous function.
	1-2	Note: Care should be taken when performing radiolabeled studies to separate analytes by chromatography with subsequent radiochemical detection. The use of total counts in crude extracts provide poor estimates of pesticide and metabolic concentrations.
3-94	19 & 23	Note: I **agree** with the evaluation of degradation/dissipation for multiple moistures, temperatures, and soil types. To do anything else is likely to significantly increase the error associated with the exposure assessment portion of the risk assessment.
3-105	Figure	Organochlorine half life of **less than two days** seems improbable. All of these curves need to be thoroughly checked. I can not believe that degradation of OCs (other than fumigants) would even show-up on a graph with a time scale of days.
3-113	15-19	Note: State that these data are not available and must be generated. This has been a continuing tenet of this document and can not be dismissed.
	24	Delete "are significant enough to"
3-115	3-4	Note: In 3rd and 4th boxes, data are not sufficiently refined and must be generated until a sufficient database is available.
4-3	7-8	Note: Quotient method is irrelevant to a probablistic modeling/risk assessment task. This is a critical point in later portions of the document.
	9	Note: USDA data shows that 40% of pest applications vary by 40% across a field.

4-10	14-15	Note: Residue consumed by individuals can be determined if you have one individual per cage. This should be required in toxicity testing.
4-18	19-20	Note: Consider altering the protocol to allow what you need.
4-19	7	Note: This is true only if they degrade to non-toxic components, which is not the normal case (e.g. aldicarb, terbufos, phorate, atrazine, DDT, Endosulfan, etc.).
4-25	25	Note: Only certain classes of cytochromes are induced by PAH-like compounds. Others have little specificity for planar compounds. This should be briefly mentioned.
4-35	1-5	Note: Empirical data are needed to estimate possible correlations between underestimation factors and relative sensitivity of the adult birds. This can not be done through modeling alone.
4-60	Table	Note: Does this table utilize insecticide data only? OPs and carbamates only? If so, text should state this and acknowledge the limitations of this database to predict LD50s for other classes of chemicals.
4-64	20-21	Note: This is quite an important point. Since esterases are highly conserved enzymes, the more varied systems could respond quite differently when evaluating chemicals with different modes of action.
4-81	2	Note: How can you test a new compound with one PT estimate? The probability estimates have SD$\geq$ mean in all cases.
	25-27	Note: This ALD approach is risky unless a minimum number of 6 animals per dose in several tests is specified.
4-82	18-20	Note: This is a critical need, but is unlikely to be resolved for use across animal classes.
4-84	1	Note: Two critical omissions in this approach are the lack of acute exposure to juveniles and assessment on long-term survival. Evaluation of reproductive effects following acute exposures to young and at critical times of reproductive development are necessary in higher level evaluation.
	6	Note: No; delayed lethality or delayed reproduction have not been adequately addressed and do not depend on bioaccumulation. This is a serious shortcoming.
4-85	25	Note: You also need effects on long-term nestling survival under stress predation.
5-8	15	Note: Assuming that a single test species represents focal species is very dangerous. You could be inordinately conservative or, worse, inordinately underprotective.

5-36	20-26	Note: Individual growth/succeptability models are essential for the proposeed risk assessment process and should be incorporated in all models when possible.
6-2	Table	Note: There is no consideration of multiple chemicals, and this is essential for realistic assessments.
6-2	Table	(5^{th} row, 5^{th} column) Note: Why is an individual crop considered? Multiple crops use similar chemicals (i.e. Atrazine and metalochlor). To consider adjacent crops and potential drift or lack of uncontaminated foraging in adjacent fields is illogical. Addressing this problem is equally of more important than culling nonsense combinations from Monte Carlo analyses. (7^{th} row, 2^{nd} column) Note: One LD_{50} is insufficient; 2 are critical. (7^{th} row, 3^{rd} column) Note: Needs to be 3 $LD_{50.}$
6-3	17	Note: If this is true, then 1 LD_{50} is too little data.
	25-28	Note: Then suggest phasing quotients out over X years.
7-6	13	Note: It is critical that the radiolabelled study incorporate chromatography separtion followed by radiochemical detection.
7-7	1-5	Note: Eliminating empirical data cannot be reasonably justified, unless the summation of errors in the assessment can provide an output that has some reasonable variance about the ultimate outcome survival at the population level.
7-12	27	Note: Add relevant sublethal observations. This is critical to a realistic risk assessment.
C1-6	6-7	Note: Using active time is very important in estimating PT.
	30	Note: Instead of guessing, establish foraging range by using telemetry and interval cameras or experimenter observations. If we are already guessing, probabilistic modeling is doomed.
C1-7	1-3	Note: Run a few sensitivity analyses. I am sure PT will show itself to be a critical factor.
	24-26	Note: This statement needs to be placed up front, not buried in an appendix.
C3-24	general	Does evidence exist for the amount of small “grit” that are ingested and rapidly passed through the GI tract. This is an important consideration in the assessment of relative grit sizes ingested.
C9-27	4-9	Chemical uptake by earthworms is well researched and needs to be better referenced in this section. Also a new approach by Awata and Anderson

(submittted to Chemosphere) should be incorporated in to this section. New field methods should also be expanded throughout the document to obtain empirical data that will improve model estimates.

MINOR COMMENTS

TABLE OF CONTENTS

Page	Comment
i	Use uniform capitalization in headings
ii	Section 1.9.1: define “PDF” Section 1.9.3: “Dose” to “Doses”
iii	Section 3.3 and subheadings: Use uniform capitalization in headings.
iv	Section 3.5.4: define “GEM”
vii	Section 4.4.2.2: mispelled word.
x	Section 7.5: change “carrying out” to “conducting”

1.0 INTRODUCTION

Page	Line	Comment
1-1	20	Change “they” to “methods”
1-3	19	Strike “The type of”
1-4	1	Change “need” to “must”
	1	Change “of the ecological” to “of ecological”
	9	Change “take up” to “address”
1-5	12	Change “information on stressor” to “information on a stressor”
1-6	15-23	Use present tense in first word of each line.
	15	Use consistent bullet size
	21-22	Context is unclear
	23	Change “studies” to “study”
1-7	1	Change entire line to “Developed suggestions describing incorporation of these new tools and models into the”

	12	Delete the first “their”
1-10	7	Change “the assessment.” to “assessments.”
1-9	15	Note: Reviewers will understand the basis of quotient, but there should at least be a reference for quotient calculations here.
1-11	6	Change “mathmatical statistics” to “mathematics”
1-14	3	Change “Mis-specification” to “Inaccurate specification”
	3	Change “the out put” to “output”
1-15	26	Change “result in” to either “cause” or “produce”
	26	Replace “accounting for” with “recognizing”
1-16	2	Replace “lead to” with “cause”
	16	Change “necessitate” to “require”
	17	Change “is” to “will be”
	18	Change “the predicted” to “predicted”
	18	Delete “The” at the end of the line
	20 & 25	Replace “would” with “should”
	24	Change “The results” with “Results”
	26	Replace “focusing on” with “emphasizing”
1-17	1	Replace “would” with “should”
	19	Replace “may occur” with “exists”
	20	Replace “of a specified magnitude of risk” with “that a specified outcome”
1-18	3	Replace “account for” with “mitigate”
	3	Replace “It” with “Specifying acceptable conservatism”
	5	Replace “need to” with “must”
	10	Delete “the” before “true”
	14	Insert “which are” after “nature”
	14	Replace “on” with “describing”
	15	Replace “on” with “for wildlife”
	16	Note: Must reference rarity of data.
	20	Change “to reduce the uncertainty to a minimum” to “to minimize the uncertainty”
	21	Insert a comma after “Then”
	23	Replace “The practical” with “Practical”
1-19	22	Delete “the” before “more”
	23	Insert a comma after “assessment”

1-20	9	Replace “may need to” with “should”
1-21		Use consistent capitalization of “Levels”
1-23	5	Note: sentence loses clarity
	23	Define terms, μ and σ
1-26	8	Replace “runs result” with “produce”
	10	Delete “any” before “significant”
1-27	7	LOAEC
	13	Delete space before period
1-28	11	Replace “result in” with “comprise”
	18	Add “for the organism in question.” at end of sentence
1-29	Center graph	Note: X-axis label should be more specific, i.e., chemical movement/transformation
1-30	2	Delete “the”
	4-5	Note: The second example does not make sense
	17	Replace “result” with “produce” or “generate”
1-32	Graph (A)	Note: Line should be a sigmoid.
1-33	3	Delete “only”
1-34	Graphs	Make distributions look more distinct.
1-35	3	Move “available” to before “PDFs”
	7-9	Note: This is redundant. See pg. 1-33, lines 3-5.
	24	Correct pagination.
1-37	15	Define “large populations”
1-38	7-12	Note: This paragraph is a restatement of previous paragraphs.
1-39	Graph C	In X-axis caption, change “affected” to “unaffected”

2.0 PROBLEM FORMULATION

Page	**Line**	**Comment**

2-1	18	Replace “are” with “is”
2-2	3-4	Note: Are the state references correct?
	10	Replace “on” with “describing”
	22	Replace “they” with “it”
2-4	10	Replace “accounting for” with “emphasizing”
	11	Misspelled word: riska
	14-15	Change “the use of pesticides pose” to “that pesticide use poses”
2-5	1	Replace “the magnitude of toxicity” to “direct lethality”
	2	Replace “result in” with “cause”
	3	Replace “lead to” with “induce”
	8	Misspelled word: vary
	10	Change “have significant effects on” to “significantly effect”
	15	Replace “results in” with “causes”
	17	Change “have indirect effects on” to “indirectly effect”
	21	Delete the last “the”
	22	Delete the first “the”
	22	Change “needs to be” to “must” or “should be”
2-6	6	Change “non-targets.” to “non-target organisms.”
	7	Delete “The”
	9	Replace “are” with “requires”
	10	Change “residues levels” to “residue concentration”
	11	Change “behavior” to behavioral”
2-7	4	Replace “part” with “aspect”
	16	Add “limitations” at end of sentence
	19	Change “better define” to “refine”
2-10	4	Delete first “the”
	6	Delete last “the”
	7	Delete “questions”
2-11	5	Change “to factor into the” to “factors for the”
	11	Change “The label also provides” to “Labels also provide”
	20	Delete space after left parentheses
	21	Delete “The”
2-12	1	Delete “that need”
	18	Change “levels of pesticide residues” to “pesticide concentrations”
	19	Change “residue levels” to “concentrations”

2-14	24	Replace “on” with “describing”
2-15	13	Insert “the point in a risk assessment” after “about”
	24-26	Note: Statement is true only for acute studies and mortality studies.
2-16	9	Insert “wildlife” before “behavior”
	22	Change “carry out” to “conduct”
2-18	Graph	Note: Each span on the X-axis should occur at a different place on the temporal continuum.
2-19	10	Replace “and in” with “and at”
	17	Change “can result in” to “should produce”
	22	Note: Presence in the test area is the most important factor.
2-20	10	Delete “of the”
	11-12	Replace entire sentence with “Few data describe the comparative sensitivity of wild bird species to pesticides.”
2-21	21	Insert “and their behavior” before “render”
2-22	3	Change “is” to “are”

3-0 EXPOSURE ASSESSMENT

Page	Line	Comment
3-1	7	Replace “introduced into” with “encountered by”
3-1	20	Add “(e.g., toxicokinetics)” after “organism”
3-2	1	Delete extra period
	2-4	Note: This only considers oral exposure; needs to be expanded.
	18	Replace “particles” with “aerosols”
	22-23	Change “a number of” to “many”
3-3	Graph	As mentioned in Chapter 2, there is no mention of groundwater here. It would be appropriate to discuss groundwater.
3-4	4-5	Change “pesticides or fine . . . into the lungs.” to “pesticides, fine particulates, or droplets are respired.”
3-5	4	Replace “attribute factors” with “attributes”
	8	Replace “Others” with “Other”
	15	Insert “Law” after “Henry’s”
	15-16	Move “diffusivities” to follow “constant”
	17	Insert “Redox potentials” after “washoff,”
	20	Delete “crop,”
3-7	1	Note: “preening/grooming behavior” is oral exposure.
	9	Replace “make it a” with “introduce”
	10	Change “accurately estimate dose to” to “accurate dose estimates for”
	11 & 12	Delete “the”
3-8	14	Note: Do you need t_{ij1} or t_{ij2}? Would it not be more appropriate to use t_1 or t_i and $\sum$ over variable numerator = ? If not, why is subscript k omitted from time term in $\int$ form?
3-9	19	See form similar to suggested form for pesticide exposure concentrations.
3-10	15	Note: What about long-range atmospheric transport for something like lindane?
	18 & 20-21	Move ($TFIR_i$) to before (Pf_{ij})

3-13	20	Replace “imply” with “include”
3-16	6	Note: “Crocker et al., in prep.” is not in literature cited.
3-18	1 & 6	Replace “on” with “describing”
3-19	2-3	Change “take account of this” to “evaluate these interactions”
	5-15	Note: I have read this exact text before. Please rephrase or delete.
	17	Note: What system does “such a system” refer to, GIS?
	21	Replace “on” with “defining”
	22	Replace “modelling” with “modeling”
	23	Replace “The” with “Wildlife”
	24	Replace “on” with “describing”
	25	Replace “on” with “delineating”
3-21	10	Replace “on” with “describing”
	23	Note: Data needs to be developed, not judged.
3-22	3	Replace “good enough” with “adequate
	20-22	Replace “bouts” with “intervals”
3-23	3	Replace “bouts” with “intervals”
	5	Replace “on” with “documenting”
	16	See comment on p. 3-27, line 27
3-25	10 & 11	Use consistent capitalization
	15	Replace “account for” with “incorporate”
3-26	1	Insert “the” between “to” and “scenario”
	13	Insert spaces between amounts and gram abbreviation
	17	Replace “on” with “specifying”
	17	Delete “if available”
3-28	8 & 11	Replace “on” with “regarding”
	12	Delete “to”
	21	Replace “on” with “of”
3-29	3	Note: What residues?
	25	Replace “take account of” with “incorporate”
	28	Replace “allow for” with “accommodate”
3-30	9	Note: Add references for live invertebrates containing more varied pesticides.
	19	Replace “on” with “describing”

3-31	6	Change “data on FDR . . . available from data of Fischer and Bowers (1997) and Brewer et al. (1997).” to “FDR data . . . available (Fischer and Bowers, 1997; Brewer, et al., 1997).”
	17	Insert “to” after “would be”
	25	Replace “account for” with “evaluate”
3-31	5-27	Note: This section repeats Appendix C2
3-32	1-6	(See note above)
3-36	14	Change “assessing” to “assess”
3-37	8	Note: Add citation: Cobb, et al., in press.
	10	Note: Why not passerines?
3-38	5	Change “and by age or” to “by age and by”
3-40	19	Note: Need to add equation number.
3-41	10	Note: Need to cite year of handbook.
	13	Insert “significantly” after “differ”
3-42	2	Note: Some animals do not ingest water directly. This should be noted, especially for arid/irrigated lands.
	22	Add citation.
3-44	17	Add reference.
3-45	4	Delete “for”
	13	Insert “third” before “conceptual”
3-48	27-28	Note: This sentence is useless without supporting data.
3-50	8	Note: Does definition of probabilities not require bounds, e.g., standard error?
3-52	10	Define “peak-day”
3-55	13	Note: Do estimates include birds?
3-62	6	Replace “width” with “thickness”
3-66	17	Note: Computer models only work when field-validated kinetic data are are available.
	24	Add reference.

3-67	14	Delete “for”
3-69	3	Delete second “as well”
	3-9	Note: What about grasses? Are they considered to have leaves?
3-72	4	Delete second period
3-75	20 & 21	Insert “pseudo” before “first”
3-77	1-3	Note: What about effects of carriers such as xylene on metal behavior?
3-78	2-3	Note: Incorrect; the reason is that pesticide concentration is small compared to reactants (H_2O, O_2) and microbial numbers.
	5-6	Replace “non-linear” with “logarithmic”
	8	Delete “first”
3-83	13-15	Note: How does someone access OPP database?
3-86	13	Change “come into contact with” to “contact”
	17	Change “result in” to “deposit”
	20	Note: See Brewer, et al., Tank, et al., and Mellott, et al.
3-87	13	Note: Were all invertebrates surface dwelling, or were there sub-surface invertebrates as well?
	20	Replace “levels” with “concentrations”
3-89	10	Replace “levels” with “concentrations”
3-91	22	Delete second period.
3-93	2	Insert “and non-radiolabeled” before “material”
3-95	3	Replace “could” with “should”
	25	Delete “out”
3-99	10-12	Delete “enough”
3-100 to 3-102		Page numbers are missing
3-104 to 3-106		Page numbers are missing
3-106	Figure	Again, organochlorine peak seems improbable. Is the carbamate t_{y2} > OP t_{y2}?

4.0 EFFECTS ASSESSMENT

Page	Line	Comment
4-2	Figure	Insert “Phenotypic Polymorphism” between “Genetic Polymorphism” and “Variance . . . Species”
4-7	26	Note: Is “weeks” the upper limit?
4-9	7	Change “dealt with” to “considered”
	9-11	Note: This sentence is not clear.
	17	Change “1991.)” to “1991).”
	17	Change “taken into account” to “considered” or “evaluated”
	22	Change “end” to “portion”
4-11	5	Note: Why not determine assimilation and depuration?
4-13	3	Note: “Fecal” is fecal-urate for birds.
	20	Replace “levels” with “concentrations”
4-14	2	Insert space after comma
4-17	9	Replace “may” with “will”
4-23	18	Insert “to” between “due” “herbicides”
4-36	17	Delete second “are”
4-41	8	Change “meets” to “meet”
4-55	2-25	Delete entirely because it is redundant
4-62	Table	Note: Extrapolation factor column needs SD of SE.
4-75	4	This is a good and important point.

5.0 RISK ASSESSMENT METHODOLOGY

Page	Line	Comment
5-1	21-22	Note: Awkward format.
5-2	5	Replace "%" with "fraction"
	8	Insert comma after "level"
	18	Replace "be provided" with "receive"
5-4	4	Change X-axis label on graph A to "concentration in environment"
5-5	5	Note: You must assess juvenile and adult life stages.
5-10	9	Change "An essential element" to "Essential elements"
	10	Insert "to" after "and"
5-11	6	Replace "increased" with "inordinate"
	9	Note: Without evaluating foraging behaviors (i.e., probing in crop furrows), there may be no safety factor or a factor <1.
5-12	13	Insert comma after "generated"
	22-28	Note: Awkward format.
5-15	19	Note: Is "%" necessary?
5-18	3	Note: Should the slice extend all the way to the xintercept for exposure probability? It seems X intercept for effect probability would be more appropriate. Maybe use hatch designation for 0-90% exposure and crosshatch for overlap of exposure with effect.
5-19	1	Note: This section should state how exposure distributions are determined. For this to have any meaning, the reference toxicity must be known to be representative or conservative.
	8	Note: When actual distributions for key/focal species are not available, distributions for the most closely related species should be used.
5-21	9	Note: Is the Y-axis probability a probability of exceedance? If so, at Q=0, probability=1 which is a false statement.
5-23	3	See note above regarding probability of exceedance.
	9	Note: These models must include soil ingestion while foraging as well as ingestion while actively searching for grit.
5-25	15-16	Note: This is a biased statement, especially to the novice reader. There

		must be an ‘or statement’ with an example of predation avoidance or foraging reduction from “sublethal”/indirect effects in the field.
5-27	9 & 16	Note: What modeled parameter can be determined with 100% certainty?
	10	Note: Is this procedure capable of providing data with three significant figures?
5-34	13-14	Note: If this is across a landscape, the model should consider covariance of application in farming districts, counties, etc.
5-35	23	Note: Isn’t P_1 by definition 1?
	26	Note: Is this an absolute difference?

6.0 LEVELS OF REFINEMENT FOR THE ASSESSMENT PROCESS

Page	Line	Comment
6-10	2	Replace “taken” with “made”
6-12	Figure	Note: It should be stated that mitigation could include all actions, from practice alterations to elimination of product use.
6-13	14	Insert a comma after “past”

Appendix A1

A1-1	6	Change “Carla” to “Carlo”

APPENDIX B3

Page	Line	Comment
B3-1 to B3-10		In general, no literature is cited, although references appear in text.
B3-1	7	Note: This measurement is quite small.
	12-13	Change “tests for quail . . . if available.” to “tests for representative passerine if available. In the absence of passerine data, quail or mallard toxicity data should be used.”
B3-4	23	Move this heading to the next page.
B3-5	24	Move this heading to the next page.

APPENDIX C1

Page	Line	Comment
C1-1	22	Replace “estimating” with “estimate”
C1-2	6-9	Note: Radiotelemetry will easily accomplish this.
C1-3	22-29	Note: Telemetry will easily accomplish this.
C1-4	1-2	See note above.
C1-8	3-12	Note: A better word could be selected than “clump.”
C1-11	12	Note: I agree with this statement, but have not seen data supporting this conclusion through the first mention of this appendix in Section 3.3.2.

APPENDIX C2

Page	Line	Comment
C2-1	5-11	Note: Include a few APHIS-USDA references to technical reports.
	30	Replace “post-ingestional” with “post-ingestion”
C2-2	11-15	Note: Examples indicate a covariance of AV and indirect effects. This should be incorporated in ECOFRAM.
	14	Replace “need to” with “should”
	26	Replace “break down” with “be reduced”
	28	Change “must be aimed at quantifying” to “must quantify”
C2-3	11	Replace “as to” with “regarding”
	20	Replace “on” with “describing”
	28	Change “show sufficient signs of” to “induce sufficient”
C2-4	14	Insert comma after “In some studies”
	16	Delete “the” after “that”
C2-5	Figure	Note: This information is already in Figure 3.3.3. Do you need it here as well? You need to define r^2 and p.
C2-7	3	Change “level” to “levels”
	6	Delete “attention is centered on”
	7	Add “is emphasized” after “feed”
	14	Delete “shown to be” and “very”
	19	Insert comma after “mortalities”
	24	Replace “was” with “were”
	26	Insert comma after “pigeon)”
	27 & 29	Note: Woodpigeons should not be capitalized.
	28	Delete “very well” and “very”
C2-8	3	Replace “on” with “describing”
	7	Delete “the”
	13	Replace “taking account of” with “incorporating” or “considering”
	20	Note: You must place limits on the definition of “very short-term.” To a chemist, very short-term is nanoseconds, not minutes or hours.
	21	Note: Again, give bounds to the term “long-term.”
C2-9	4	Replace “levels” with “concentrations”
C2-10	14	Replace “on” with “defining”
	21	Delete “aim to”

Appendix C3

C3-5	7	This and similar Rate Constants are PSEUDO first order as mentioned in several sections of the ECOFRAM document.
C3-6	3	Searching for grit is not the only route to obtain granules. The model must at least state that soil probing for food can also occur. This statement is necessary even if the mathematical treatment of the two processes is combined into one term.
	12	Add comma after implementation
	17	Add comma after available

APPENDIX C4

Page	Line	Comment
C4-1	4 & 18	Note: References are not included in literature cited.
C4-2	6-7	Note: References are not included in literature cited. ReferenceCs should be first author and "et al."
	18	Note: What about aerial sprays?
C4-3	17	Delete "for"
C4-4	14	Note: Wrong character defined.
	17	Move equation to between Lines 12 and 13.
	19	Insert equation for "Z"
C4-5	2	Move equation to between Lines 10 and 11.
	8	Note: Wrong character defined.
	11	Note: Is "g/ton" a single value, e.g., ~900, or g pesticides/tons soil?
C4-6	12-15	Note: Correct spacing.
C4-7	3	Delete "down"
	7	Insert comma after "In general"
C4-8	4 & 6	Note: Use consistent character definition.
C4-9	7	Note: What are "a" and "b"?
C4-10	5-6	Note: Define terms used in equations.
C4-11	1-2	Note: Correct spacing.
	13-14	Note: This equation says that 1 cm removes 10% of pesticide. Is this correct?
C4-12	8	Note: For a given plant, it is much closer to repeated or single instantaneous events.
	13	Note: Why change from t_i to t?
C4-15	15	Note: Reference is not included in literature cited.
	20	Insert "pseudo" before "first"
	21	Insert: This is a reasonable assumption since pesticide concentration will not likely be much lower than concentration of degrading entities: water, ligt, microbes, oxidants.

C4-16	7	Add reference number for figure.
C4-22	17	Note: Change first reference to “Patterson, et al., 1994;”
C4-23	2	Add “(atm)” at end of equation
	3	Add “(mole/m^3)” at end of equation
	4	Add “(mole/$m^3 \cdot$atm)” at end of equation
C4-25	17	Note: Does “K_{ow}/K_{oc}” represent a ratio or a choice between two constants?
C4-26	12	Insert parentheses around “unitless”
	14	Insert “Law” after “Henry’s”

Appendix C6

C6-2	¶1	This paragraph is needed in the main body of the document on p. 3-78. And the text should be only briefly mentioned here.
C6-3	Last ¶	This and the next page is redundant with main text and should be condensed significantly or should simply reference the main text.
C6-4	6	No figures are included in this appendix.

Appendix C9

C9-1	last ¶	This statement has been made in one form or another at least four times previous to this point it is certainly redundant by now.
C9-2	20	Add a space before Furthermore
C9-4	16 17	Term $t=t_{i=1}$ never shows up in the equations. Should the time designator on the right side of the equation be $t=t_{i=1}$?
C9-6	Last	Capitalize SD
C9-7	11	Symbol should be phi not theta
C9-8	7	Again, the rate constants are PSEUDO first order unless measured and determined to be first order.